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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,341	12/05/2003	David H. Shen		1135

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EXAMINER

VO, NGUYEN THANH

ART UNIT	PAPER NUMBER
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2618

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/729,341

Applicant(s)

SHEN, DAVID H.

Examiner

Nguyen T. Vo

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 1-12 are objected to because of the following informalities: regarding claim 1, there must be only one period "." in the claim; therefore, the recitation "current source. Each output" at lines 9-10 should be changed to --current source, each output--; regarding claim 5, the recitation "the second and third transistor sources are connected series inductor" should be changed to --the second and third transistor sources are connected to series inductor--.

Appropriate correction is required.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation "the second and third transistor sources **are connected series inductors**" in claim 5 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification must provide proper antecedent basis for the claimed subject matter "the second and third transistor sources **are connected series inductors**" in claim 5.

Claim Rejections - 35 USC § 112

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5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the claim is indefinite because the preamble of the claim calls for a **method** while the body of the claim has a structure of an **apparatus** claim. In order to overcome this rejection, it is suggested that the recitation "A method for a high dynamic range mixer" at line 1 should be changed to -- A high dynamic range mixer--.

Regarding claim 10, the claim is indefinite because it is not clear to as what are being claimed.

Regarding claim 12, the recitation "the current source transistors are replaced by resistors" render the claim indefinite because it is conflict with claim 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaji (5,634,207, cited by the examiner; hereinafter simply referred to as Yamaji'207) in view of Yamaji (6,381,449, cited by the examiner; hereinafter simply referred to as Yamaji'449).

As to claim 1, Yamaji'207 discloses in figure 5 a high dynamic range mixer comprising a first transistor 33 whose gate is connected to an RF input (see the RF input in figure 5) and whose drain is connected to the sources of a second and third transistor (see the differential pair 32) whose gates are connected to a differential local oscillator inputs (see the differential LO signals in figure 5), and each connected to a fourth and fifth transistor (see the two transistors in block 31) each acting as a current source. Yamaji'207 thus discloses all the claimed limitations except that the drains of the second and third transistors are each connected to one input of a differential operational amplifier, and each output of the differential operational amplifier is connected to an input of the differential amplifier through a first and second feedback load device, as specified in the claim. Yamaji'449 discloses in figure 2 a mixer wherein the drains of a second and third transistors (see the two transistors Tr2 and Tr3) are each connected to one input of a differential operational amplifier (see the operational amplifier in block 22), and each output of the differential operational amplifier is connected to an input of the differential amplifier through a first and second feedback load device (see the two feedback load devices, wherein each feedback load device comprises a resistor R and capacitor C). Yamaji'449 further discloses current sources coupled to the drains of the second and third transistors (see the current sources 11 and 12). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Yamaji'449 to Yamaji'207, in order to have advantage of not generating intermodulation by the nonlinearity of collector/drain parasitic capacity (as suggested by Yamaji'449 at column 5 line 50-62).

As to claim 2, the combination of Yamaji'207 and Yamaji'449 discloses that the RF input is differential and the mixer is a double-balanced mixer (see Yamaji'207, column 8 lines 48-52).

As to claim 3, the combination of Yamaji'207 and Yamaji'449 further discloses that the first transistor source is connected to a series degeneration resistor (see Yamaji'207, figure 5).

As to claims 6-7, the combination of Yamaji'207 and Yamaji'449 discloses the claimed limitations (see parallel combination of R and C in figure 2 of Yamaji'449).

As to claims 8, 10, Yamaji'207 discloses bipolar transistors (see figure 5).

As to claim 9, the combination of Yamaji'207 and Yamaji'449 fails to disclose that the transistors are MOS as claimed. The examiner, however, takes Official Notice that using MOS transistors in a mixer is known in the art (for example, see the prior art of figure 3 in the instant application as admitted by applicant). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the use the conventional MOS transistors in the mixer of the above combination, because the MOS transistors have advantages such as easily manufactured and being placed in an integrated circuit.

As to claim 11, the combination of Yamaji'207 and Yamaji'449 further discloses that the operational amplifier has a common-mode feedback circuit connected to it (see the common-mode feedback circuit comprising R and C in figures 1-2 of Yamaji'449).

As to claim 12, the combination of Yamaji'207 and Yamaji'449 discloses the claimed limitations (see Yamaji'449, figure 1 which shows resistors R1-R2 are used instead of current sources 11-12 in figure 2).

9. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaji'207 in view of Yamaji'449 as applied to claim 1 above, and further in view of Komurasaki (6,826,393, cited by examiner).

As to claim 4, the combination of Yamaji'207 and Yamaji'449 fails to disclose that the second and third transistor sources are connected to a series degeneration resistors.

As to claim 5, the combination of Yamaji'207 and Yamaji'449 fails to disclose that the second and third transistor sources are connected to series inductors.

However, such teachings are known in the art as taught by Komurasaki. Komurasaki discloses a mixer circuit, wherein the second and third transistor sources are connected to a series degeneration resistors (see figure 2, resistors 28 and 19). Komurasaki further discloses a mixer circuit, wherein the second and third transistor sources are connected to series inductors (see figure 3, inductors 37-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Komurasaki to the combination of Yamaji'207 and Yamaji'449, in order to increase the conversion gain and make the mixer suitable for low voltage operation (as suggested by Komurasaki at column 5 lines 13-39).

Conclusion

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10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Andrys (6,057,714) discloses mixer circuit.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen T. Vo whose telephone number is (571) 272-7901. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571)272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nguyen Vo


3-12-2006

NGUYEN T. VO
PRIMARY EXAMINER